REMARKS

Reconsideration and allowance of the above referenced application are respectfully requested.

Claims 1-20 stand rejected under 35 USC 103 has allegedly being unpatentable over U.S. patent number 6, 165,876 (876) to Yamazaki in view of U.S. patent number 5,760, 405 (405) to King. All of the claims have been amended to better emphasize their patentable distinctions. As amended, it is respectfully suggested that all of the claims should be in condition for allowance.

As amended, each of the claims recites a magnet for separating the extracted ions on a mass basis. In other words, the ions are separated by the magnet after the ions have been extracted by the extraction electrodes.

Many of the claims define an ion doping apparatus with a gas source that introduces gases, a power source that generates a plasma before the gas, an extraction electrode that extracts ions from the gas, and a magnet that separates the extracted ions on a mass basis. These claimed features are recited and supported by figures 6a - figure 9. Moreover, it is respectfully suggested that these features totally distinguish over the prior art.

'876 does not teach a magnet for separating ions on a mass basis.

Moreover, the missing teaching is not made up by 405. 405 teaches magnets 48 that are provided within the chamber 41. Ions are separated into either primary or secondary ions within the chamber 41, see. 405 column 8 lines 65 through column 9 line 33 and figure 3 b. 405, however, does not teach separating the ions after the ions have been extracted by the extraction electrode, as recited by claims 1,7, 12 and 18. 405 shows magnets in figure 14, labeled 136 a-136 d. These magnets are after an extraction electrode 96. However, these are not magnets that separate the extracted ions on a mass basis as claimed. Rather, these magnets operate to homogenize the ion stream in order to produce a beam having a substantially uniform current density. This feature is described column 16 lines 34-38. Moreover, these magnets do not separate the ions on a mass basis as recited by claims 1, 7, 12 and 8, as claimed.

Claim 10 recites a feature of dependent claim 11 in which a diameter of the coils is monotonically decreased as a flow of ions extends downstream. This feature is supported by reference 3 1 in figure 6 a. This feature is not in anyway taught or suggested by 876 in view of 405, and therefore, it is respectfully suggested that this feature should further be in condition for allowance.

In addition, applicants add new claims which should be allowable on their own merits. New claims 21, 25 and 35 recite

a part for applying a magnetic field to ion current in a direction that is substantially parallel with an elongated cross-section of the ion current. This feature is supported by reference numerals 54 or 55 in figure 6B.

New claims 29 and 32 recite a portion of the ion current passing through an acceleration electrode, or one of two ion currents not being accelerated by the acceleration electrode. This feature is supported by figures 8 and 9 and should also be allowable for similar reasons. An information disclosure statement is also filed herein.

In view of the above amendments and remarks, therefore, all of the claims should be in condition for allowance. A formal notice to that effect is respectfully solicited.

Please apply any charges or credits to Deposit Account No. 06-1050.

Respectfully submitted,

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VERSION TO SHOW CHANGES MADE

In the Claims:

Claim 11 has been canceled.

Claims 1, 7, 10, 12 and 18 have been amended as follows.

1.(Amended) An ion doping apparatus comprising:

a gas source for introducing a dopant gas and a second gas for diluting said dopant gas into a chamber;

a power source for generating a plasma of said dopant gas and said second gas;

an extraction electrode for extracting ions of said dopant gas and said second gas;

a magnet for separating the extracted ions on a mass basis;

a slit for cutting a first portion of said ions separated by said magnet while allowing a second portion of said ions to pass through said slit;

a substrate holder for holding a substrate, wherein said substrate is [a substrate to be] subjected to a flow of said second portion of said ions wherein said flow of the second portion of said ions has a cross section at said substrate, said cross section being elongated in one direction, and

a moving means for moving said substrate in an orthogonal direction to the elongation direction of said cross section.

7.(Amended) An ion doping apparatus comprising:

an ion source containing ions of a dopant gas;

an extraction electrode for extracting the ions of said dopant gas;

a magnet for producing a magnetic field to separate the extracted ions on a mass basis;

an acceleration electrode for accelerating the extracted ions toward a substrate so that said substrate is irradiated with a beam of said ions wherein said beam has an elongated cross section at said substrate;

a substrate holder for holding said substrate; and

a means for moving said substrate in an orthogonal direction to the elongation direction of said elongated cross section,

wherein said magnet is located between said [plasma] extraction electrode and said acceleration electrode.

10.(Amended) An ion doping apparatus comprising:

an ion source containing ions of a dopant gas;

an extraction electrode for extracting the ions of said dopant gas to form a flow of ions of the dopant gas;

an acceleration electrode for accelerating the flow of the ions of the dopant gas toward a substrate;

a substrate holder for holding said substrate; and

coils located between said extraction electrode and said acceleration electrode to shape a cross section of said flow into a line shape wherein said cross section is taken along a plane perpendicular to the flow, and wherein a diameter of said coils is monotonically decreased as the flow of said ions extends downstream; and

a means for moving said substrate in an orthogonal direction to an elongation direction of said line shaped cross section.

12.(Amended) An apparatus comprising:

a gas source for introducing a dopant gas and a second gas for diluting said dopant gas into a chamber;

a power source for generating a plasma of said dopant gas and said second gas;

an extraction electrode for extracting ions of said dopant gas and said second gas;

a magnet for separating the extracted ions on a mass basis;

a slit for cutting a first portion of said ions separated by said magnet while allowing a second portion of said ions to pass through said slit;

a substrate holder for holding a substrate, wherein said substrate is [a substrate to be] subjected to a flow of said

second portion of said ions wherein said flow of the second portion of said ions has a cross section at said substrate, said cross section being elongated in one direction; and

a laser irradiation means for irradiating said substrate with a laser beam while moving said substrate in a direction orthogonal to an elongated cross section of said laser beam after said substrate is subjected to said flow of said ions.

18.(Amended) An apparatus comprising:

an ion source containing ions of a dopant gas;

an extraction electrode for extracting the ions of said dopant gas;

a magnet for producing a magnetic field to separate the extracted ions on a mass basis;

an acceleration electrode for accelerating the extracted ions toward a substrate so that said substrate is irradiated with a beam of said ions wherein said beam has an elongated cross section at said substrate; and

a laser irradiation means for irradiating said substrate with a laser beam while moving said substrate in a direction orthogonal to an elongated cross section of said laser beam after said substrate is irradiated with said beam of said ions,

wherein said magnet is located between said [plasma] extraction electrode and said acceleration electrode.

New claims 21-37 have been added.